TITLE OF THE INVENTION

Fish Protecting Covers for Fish Weighing Device Jaws

CROSS-REFERENCE TO RELATED APPLICATIONS

This is a continuation-in-part of application No. 10/194,384 filed July 12, 2002.

STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC

Not applicable

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention is generally directed to fish-handling equipment, and more particularly to a fish scale which includes pivotally moveable opposing jaws, the distal lower ends of which are covered with textured molded GRIP SOCKS which engage the lower lip of the fish for better retention during weighing and without harm to the fish.

Description of Related Art

For the more serious fishermen and in tournament competition, the ability to catch, weigh and release fish unharmed should be facilitated by fish-handling tools for this purpose. Once a fish is caught and landed, the precise weighing of the fish and the recordation of data is best accomplished with a fishing tool which does not injure the fish so that it may be returned to the sea.

One such device known to applicant was invented by Camp and is disclosed in U.S. patent 5,119,585 and currently marketed under the trademark BOGAGRIP. This

patent teaches a fish-handling tool having a complex structure which causes opposing jaws to pivotally move from an automatically locked closed position wherein the distal lower ends of the jaws touch one another to an open position wherein the lower lip of a fish may be positioned there between, after which the releasing of a longitudinal actuator of the device causes the jaws to re-close on the lower lip. Thereafter, the Camp device is provided with a conventional tubular spring scale with incremental readings for fish weight inscribed along an inner tubular member within the handle. However, this device has no means for the accurate digital reading of fish weight and has no provision for the storing of data with respect to each fish caught and weighed. Moreover, it is not buoyant.

In U.S. Patent 5,031710, Parker teaches an electronic fish scale which utilizes the linear displacement of a spring along a variable resister to provide an electrical signal in proportion to the amount of weight of the fish hung therefrom. A pair of fish-handling pliers is disclosed in U.S. Patent 6,256,923 invented by Norton which is structured similar to that of a conventional pair of Vice Grips having spaced jaws which come together over the lower lip of the fish, presumably without harming the fish.

A fish stringer with floating weight indicator is disclosed by Coles in U.S. Patent 5,987,808. This invention, which does not weigh a fish, is generally directed to a conventional fish stringer having an openable hook attached to one end and a floating weight indicating device attached to the other end of the elongated flexible cord. Although this device does not actually weigh a fish, it includes rotatable discs each bearing numerical indicia which may be positioned to indicate the weight of the fish before it is placed in a live fish well. The fisherman may then easily observe the weights of all of

the fish in the well by simply looking at each of the floating weight indicating devices attached to the corresponding fish.

The present invention provides a fish scale which incorporates all of the benefits of the above prior art with the addition of several added features. A simplistic, yet effective design for opposing c-shaped openable jaws is also provided for harmlessly engaging the lower lip of a fish while being weighed by the device. Molded resilient plastic covers ("GRIP SOCKS") for the distal end portions of each jaw for enhanced grippability and protection from harming the mouth of the fish are also provided. Moreover, the housing is ergonomically configured to facilitate hand holding of the device while the jaws are opened and closed and while the fish is being held for weighing therefrom. An aperture is also provided to attach the device either to a rope or hook to facilitate fish weighing.

BRIEF SUMMARY OF THE INVENTION

This invention is directed to an electronic fish scale including a molded housing having upper and lower portions for supported hand grasping and a pair of opposed C-shaped jaws which open when a jaw actuator is manually moved upwardly to receive a lower lip of a fish securely held and unhurt between the jaws when closed for weighing the fish, a jaw tip cover for the lower distal end portion of each jaw half. The jaw tips or GRIP SOCKS are over-molded of resistant plastic material to enhance gripability of fish lips and to reduce harm to the fish when released.

It is therefore an object of this invention to provide a fish scale which is easily portable and hand-holdable during both fish engaging and fish weighing procedures.

It is another object of this invention to provide a fish scale having multi-function digital display screen and pivotally openable jaws which are harmlessly engagable with the lower lip of a fish.

Still another object of this invention in its preferred embodiment is to provide a buoyant fish scale with non-harmful jaws which harmlessly engage the lower lip of a fish and which provides a multi-function digital L.C.D. readout display.

Still another object of this invention is to provide a fish scale which is ergonomically configured and surface textured to enhance gripability so that larger fish may be manually weighed without the need of attaching the device to a hook or a rope.

In accordance with these and other objects which will become apparent hereinafter, the instant invention will now be described with reference to the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a rear perspective view of the invention.

Figure 2 is a front elevation view of the invention.

Figure 3 is a front elevation view of the invention.

Figure 4 is a rear elevation view of the invention.

Figure 5 is a top plan view of the invention.

Figure 6 is a bottom plan view of the invention.

Figure 7 is a right side elevation view of the invention.

Figure 8 is a left side elevation view of the invention.

Figure 9 is an exploded perspective view of a portion of the invention which is connected to and continues with the other portion thereof on in Figure 10.

Figure 10 is an exploded perspective view of the other portion of the invention which is connected to and continues from in Figure 9.

Figure 11 is a perspective view of the fish-engaging assembly (12).

Figure 12 is a front elevation view of the digital display screen of the invention.

Figure 13 is a rear elevation view of the invention in partial section with the jaws closed.

Figure 14 is a rear elevation view similar to Figure 13 with the jaws opened.

Figure 15 is a perspective view of an improved and preferred embodiment of the jaws of this invention.

Figure 16 is a side elevation view of one of the **GRIP SOCKS** mold formed around the distal end portion of each of the jaws.

Figure 17 is a side elevation view of Figure 16.

Figure 18 is a longitudinal section view of Figure 16.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the drawings and particularly to Figures 1 to 8, the invention is there shown generally at numeral **10** and includes a molded plastic housing **11** formed of thin-wall molded ASA plastic in two halves **14** and **16**. The fish scale **10** of the present invention also includes a fish-engaging assembly shown generally at numeral **12** also shown in Figure 11 which includes a pair of identical jaws **22** and **24** having lower distal portions **26** and **28** which meet at a center point **25** along the longitudinal axis of the device **10**. As best seen in Figures 3 and 4, each of the jaws **22** and **24** are generally c-shaped with an upwardly extending leg portion **22a** and **24a** which is best seen in Figure 9.

The front half **14** of the housing **11** as seen in Figures 2 and 3, includes an opening through which a display (L.C.D.) panel or screen **32** may be viewed. A plurality of control buttons are also provided whereby, at button **56**, the device **10** may be activated and re-zeroed by sequentially pressing this button **56**. Button **58** provides memory recall for data stored in the electronic circuit of the invention described herebelow, while button **60** will actually affect storage of the current data shown during on the digital screen **32** as a fish is being weighed. Button **52** provides a clearing of memory, while toggle **54** allows the device **10** to operate in either a metric mode or a U.S. mode of weight measurement.

An aperture **18** is formed transversely front-to-back through the upper portion of the housing and both of its halves **14** and **16** which may be used for hanging the device **10** from a hook or a flexible rope or line which is attached to an overhead support.

The jaw actuating assembly **12** includes a flared molded plastic jaw actuator **30** which, when moved by finger or thumb pressure against the lower surface thereof, will cause it to move upwardly in the direction of arrow **D**. The internal mechanism for accomplishing the opening of the jaws **22** and **24** by this movement of the jaw actuator **30** will be described in more detail herebelow.

A battery cover **20** which is threadably disengagable for battery replacement is also provided and which is sealably engaged into cavity **69**, the rear housing half **16** as seen in Figure 9 by an o-ring **118** surrounding the perimeter of the battery cap **20** which holds a lithium ion battery **116** as best seen in Figure 10.

The housing **11** of the device **10** is ergonomically configured as best seen in Figures 3, 4, 7 and 8 such that the upper portion of the housing is enlarged at **48** and

having a central housing portion which is at its narrowest girth and width, enlarging slightly toward the lower portion of the housing. This configuration, particularly the enlarged upper portion **48**, greatly enhances the ease with which the device **10** may be hand-held in one hand while finger or thumb grasping of the jaw actuator **30** to effect opening and closing of the jaws **22** and **24** as desired. Note further that, as best seen in Figures 7 and 8, the side profile **16a** of the rear housing half **16** is concaved to better receive the palm of the user's hand, while a concaved upper portion **14a** of the front housing half **14** is also concaved for better indexed finger placement and stability.

Referring now to Figure 12, a number of functions are provided by the electronic control circuit which is positioned on a main circuit board **62** in Figure 9. The functions which are provided by this arrangement and digitally displayed at areas **A**, **B** and **C** of the digital display screen **32** are as follows:

- weight of each fish
- storage of fish weight while the fish is being weighed
- sequentially weight ordering of up to "N" numbers of stored fish weights
- recall of all fish weights sequentially by weight
- override data currently stored
- cumulative total of stored weights
- weight limit exceeded

The "override" function will automatically erase the smallest weight fish stored in the electronic circuit when the "N + 1" fish is weighed. If the "N plus 1" fish is larger than the smallest of the currently stored fish weights, this smallest one will be erased and replaced with the weight of the "N plus 1" fish.

In order to protect the device **10** from physical harm, should an overweight fish which would damage the device, either structurally or internally, be placed between the jaws **22** and **24** and weighed, a series of dash lines will appear in the central portion **B** shown in Figure 12 rather than a digital weight amount. The user is then immediately advised that the fish is too large to be lifted and weighed and should immediately be unloaded and removed from the jaws **22** and **24**.

Referring particularly to Figures 9 and 10, the components of the invention **10** within the interior volume of the housing **11** formed of housing halves **14** and **16** includes the main circuit board **62** and liquid crystal display (LCD) **32** which forms the display screen of the invention. A molded button assembly includes the covers for control buttons **56**, **58** and **60** while a separate molded button assembly includes the lower buttons **52** and **54**, the operation of which was previously described.

A sealed bezel **50** attached around the digital screen **32** insures not only decorative continuity but also provides a watertight seal between the aperture formed in the housing halve **14** and the bezel **50**.

The battery cover **20** is rotatably lockable within the mating aperture in the rear housing half **16**. Again, the o-ring **118** provides a watertight seal between the battery cap **20** and rear housing **16**.

BUOYANCY

In the preferred embodiment, the invention **10** is buoyant without a fish being entrapped between the jaws **22** and **24**. However, it is not intended that the device **10** remain buoyant or afloat should a large fish be locked within the closed jaws **22** and **24** and the device **10** be inadvertently dropped into the water.

To effect buoyancy, a STYRAFOAM molded member **114** is provided. As best seen in Figure 10, the flotation member **114** is molded of closed-cell STYRAFOAM and the like is carefully configured to essentially fill all of the unoccupied interior volume between the housing halves **14** and **16**. It has been determined that the sizing of the device as marketed will allow for this flotation member **114** to be approximately 5.2 cubic inches.

To further enhance buoyancy, a generally rectangular sealing member **66** is positioned against a mating surface of the interior of the front housing half **14** and against the perimeter of an intermediate housing portion **68** which is also formed of molded ASA plastic. A battery circuit board **64** with plug-in feature to circuit board **62** (not shown) is lockingly engagable within the cylindrical battery cap-receiving portion **69** of the intermediate housing portion **68**. By this arrangement, a separate airtight volume is effected which, when combined with the STYRAFOAM flotation member **114**, renders the device **10** substantially buoyant or floatable in either salt water or fresh water.

Percentage wise, it is estimated that the STYRAFOAM flotation member **114** provides approximately ¾ or 75% of the buoyancy required, while the air chamber provides approximately one quarter or 25% of the buoyancy needed to maintain the device **10** in a floating condition.

To help insure the gripability of the device **10** in use, especially with heavier fish and wet hands, separate contoured panels **40**, **42**, **44** and **46** are provided which are attached to the corresponding outer contoured surfaces of each of the housing halves **14** and **16**. These non-slip panels **40**, **42**, **44** and **46** are preferably formed of SANTOPRENE by an over molding process. The outer textured surface of these

SANTOPRENE panels **40**, **42**, **44** and **46** provide a high level of non-skid gripping surface for enhanced control of the device. Alternately, spray elastomeric texturing may also be utilized for this purpose. Raised ribs add to gripability.

Referring now to Figures 9 and 11, the jaw actuating assembly **12** includes the opposingly oriented c-shaped jaws **22** and **24** formed of molded plastic or stamped metal, having the upwardly extending legs **22a** and **24a**, respectively. Holes **106** and **108** are formed at the upper end of each of these legs **24a** and **22a**, respectively. Each jaw **22** and **24** also includes an acutely shaped slot **98** and **100**, respectively. An elongated u-shaped slotted jaw control member **86** is positioned between and substantially against each facing surfaces of the legs **24a** and **22a**, respectively, and includes an aperture **102** formed at the bottom thereof. Mating rivet halves **94** and **96** are lockingly engaged together through the aligned slots **98** and **100** and aperture **102** to slidably connect these three components together.

The molded jaw actuator **30** includes a longitudinal slot **91** formed therethrough which matably receives the jaw control member **86** which is rigidly held in position with the aperture **102**. The lower end of the slotted spacer **86** extends downwardly from the bottom of the jaw actuator **30**, held thusly by pins **90** which are secured in place through apertures **88** formed at the upper ends of each of the legs of the slotted spacer **86** and transverse holes **92** at the upper end of the cylindrical portion **80** of jaw actuator **30**.

An elongated, straight longitudinally extending actuator shaft **82** slidably engages through the longitudinal aperture **91** and extends upwardly therefrom. An aperture **110** at the lower end of the actuator shaft **82** is pivotally connected by a pivot pin **104** through

holes **106** and **108** formed adjacent the upper end of legs **24a** and **22a**, respectively. Thusly, actuator shaft **82** pivotally supports the jaws **22** and **24**.

The upper end **84** of the actuator shaft **82** is snapingly engaged into a slot **78** formed into one end of a molded lower support **76** of a load cell **74**. The two are attached together by a threaded fastener **122**. A return spring **85** with washers **128** and **130** positioned at either end thereof are slidably engaged over the actuator shaft **82** prior to its engagement with the lower support **76**.

Referring additionally to Figures 13 and 14, a molded upper load cell support **72** is secured by a mechanical fastener **126** to the intermediate housing portion **68**. The corresponding end of the load cell **74** is secured by threaded fastener **124** to the lower surface of the upper load cell support **72**. By this arrangement, a load placed between the jaws **22** and **24** will urge the actuator shaft **82** downwardly in the direction of arrow **F**, placing a load upon the load cell **74**. The preferred embodiment of the load cell **74** is available from Sensor Base, P/N SB-1A.

The load cell **74** produces an electrical output signal into output wires (not shown for clarity) in proportion to the amount of weight in the direction of arrow **F**. The signal wires are fed through an aperture **70** formed through the intermediate housing portion **68** which is then sealed with silicone to insure that the airtight chamber remains watertight. The load signal is then fed into the main circuit board **62**.

OPERATION

Still referring to Figures 13 and 14, the operation of the device **10** is there shown. In Figure 13, the jaws **22** and **24** are in an at-rest position and closed with the distal portions **26** and **28** contacting one another at **25**. It is during this orientation with the

lower lip of a fish held between the closed jaws **22** and **24** that the downward force **F** equal to the weight of the fish is placed upon the load cell **74** as previously described. Note that the fish weight is translated to the load cell **74** through pivot pin **104** into the longitudinal actuator shaft **82**.

The neck portion **80** of the jaw actuator **30** slidably moves within an aperture **120** formed in the bottom of the housing **11** itself. This neck portion **80** includes flanges **81** which prevent the jaw actuator **30** from being inadvertently dislodged from within the housing by the shoulders of aperture **120** as shown.

To open the jaws in the direction of arrow **E** in Figure 14, the user merely grasps the main portion of the housing and then, either by thumb action or forefinger action, moves the jaw actuator **30** upwardly in the direction of arrow **D**. Because the pivot pin **104** is attached to the actuator shaft **82** which is anchored into the components of the load cell assembly, the jaws themselves **22** and **24** do not move upwardly. As a consequence, the rotation pin **96**, which is anchored through aperture **102**, is forced to slidably move along the diagonal slots **98** in each of the jaws **22** and **24**. Note that the acute angle of these slots **98** is relatively shallow and in the range of approximately 14° to the longitudinal axis of the device. This is chosen so as to increase the mechanical leverage and smoothness of the upward motion in the direction of arrow **D** required of the jaw actuator **30**. Polishing and smoothness of these slidably interacting surfaces is also preferred.

Also note that, when the jaw actuator **30** is released and forced downwardly into its at-rest position by return spring **85**, the jaws **22** and **24** are automatically mechanically

locked together to securely retain the lower lip of a fish which has been placed between the distal tips **26** and **28**.

Referring now to Figures 15 to 18, the preferred embodiment of the jaws **22** and **24** is there shown generally at numeral **140** and **142**. These jaws **140** and **142** are identical to jaws **22** and **24** as previously described with the addition of GRIP SOCKS or jaw tip covers **144** and **146** which are mold formed to cover the distal end portions **126** and **128** of each of the jaws **22** and **24**, respectively. These GRIP SOCKS or jaw covers **144** and **146** are formed as an overmold using resilient AES SANTOPRENE having a textured finish per MOLD-TECH MT-1100 exterior surface finish requirements. When properly overmolded, these jaw protectors or covers **144** and **146** form a permanent bond with the jaws **22** and **24**, respectively.

The jaw covers **144** and **146** each include distal end surfaces **152** (not shown with respect to grip cover **146**) which, when biased together as previously described, press against and retain the lips and mouth of a fish being weighed. Molded ribs **154** which extend transversely across this distal surface **152** enhance gripability, in combination with the textured exterior surface of the jaw covers **144** and **146** to both enhance fish retention and to provide a level of reduced damage or harm caused by the gripping and weighing of a fish. The compressive or resilient nature of the overmolded plastic material forming each of the jaw covers **144** and **146** helps to accomplish this aspect of this preferred embodiment.

While the instant invention has been shown and described herein in what are conceived to be the most practical and preferred embodiments, it is recognized that departures may be made therefrom within the scope of the invention, which is therefore

not to be limited to the details disclosed herein, but is to be afforded the full scope of the claims so as to embrace any and all equivalent apparatus and articles.